

Title Translating a real-world problem into a one variable linear equation		
Grade: HS		
PA Core Standard: CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships		
PA Connector:		Translate a real-world problem into a one variable linear equation
Strand: Algebraic Concepts		Family: Problem Solving and Using Variables
Progress Indicator: H.PRF.2b creating equations and inequalities (in one or two variables) and use them to solve problems and graph solutions		
Big Idea(s): Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.		
Essential Question(s): How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?		
Foundational Knowledge: <ul style="list-style-type: none"> • Match an equation with one variable to the real world context. • Identify when addition, subtraction, multiplication and division are used in a real-word situation. • Identify the unknown value in a word problem and assign a variable. 		
Key Vocabulary, Concepts and Symbols: <ul style="list-style-type: none"> • Understand the following concepts and vocabulary: $+$, $-$, \times, \div, $=$, equals, linear, variable, vocabulary used within the context of the problem 		
Suggested Instructional Strategies: <ul style="list-style-type: none"> • Create a pictorial representation of an equation to translate from the words to an equation. • Task analysis <ul style="list-style-type: none"> ○ Present the story problem based on a real-world, relevant context and provide a template for recording facts/operation to solve the real-world problem. ○ Highlight key information in the problem; strike through irrelevant information ○ Identify what question is being asked. ○ Identify the facts. ○ Identify the unknown information (define variable). ○ Determine the operation(s) ($+$, $-$, \times, \div). ○ Fill in the facts and the operation presented in the story problem on the template. ○ State the equation. ○ Solve for x. ○ Answer the problem statement & assess the reasonableness of the answer. 		
Supports and Scaffolds Considerations: <ul style="list-style-type: none"> • Manipulatives: counters, foam numbers • Equation templates • Number line, multiplication chart, etc... • Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device) 		
Key Word Search: equation, word problem		

Title: Selecting appropriate graphical representations of a linear model based on real world events		
Grade: High School		
PA Core Standard: CC.2.2.HS.C.5 Construct and compare linear, quadratic and exponential models to solve problems		
PA Connector:		Select the appropriate graphical representation of a linear model based on real world events
Strand: Algebraic Concepts		Family: Proportional Relationships and Graphing
Progress Indicator: H.PRF.1c creating mathematical models, using rules and relationships to describe and predict objects and events in the real world		
Big Idea(s): Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.		
Essential Question(s): How can data be organized and represented to provide insight into the relationship between quantities?		
Foundational Knowledge: <ul style="list-style-type: none"> Understand that a line is a collection of points that are solutions to the linear equation. Determine if a point is or is not on a line, to see whether or not it is a solution. Identify coordinates (points) on a graph and in a data table. Match or plot the points from a data table on a graph Count the <i>rise</i> and <i>run</i> between two points on the line to determine the slope of the line. Understand that positive slopes create increasing lines, while negative slopes create decreasing lines. Identify the <i>slope</i> and <i>y-intercept</i> in equations of the form $y = mx + b$. Select a graph that represents a simple linear equation. 		
Key Vocabulary, Concepts and Symbols: <ul style="list-style-type: none"> Understand concepts and vocabulary: x axis, y axis, x intercept, y intercept, x-value, y-value, coordinate, ordered pair, line, slope, vocabulary used within the context of the problem 		
Suggested Instructional Strategies: <ul style="list-style-type: none"> Use circular stickers to locate ordered pairs on a coordinate system and determine whether those ordered pairs are solutions by seeing if they are on the line. Teach explicitly the relationship between positive slope and a line that slopes up left to right and negative slope and a line that goes down left to right. Sort a set of graphs based on a characteristic (e.g. lines that increase, lines that intersect the origin, lines that contain the point (2,4). Task analysis: <ul style="list-style-type: none"> Present a story problem and a simple equation (e.g., $y = 5x$) Create a formula template and substitute x for at least three values to determine y Create a table (T Chart) listing coordinates (x, y) Plot points on a coordinate grid; connect the points Identify the coordinates on the line graph (Reverse the steps and begin with a line graph; identify the coordinates of at least three points, create a table listing the x- and y-coordinates; write a simple linear equation to represent the line graph) 		

Supports and Scaffolds Considerations:

- Grid paper with raised perpendicular lines (horizontal and vertical lines) and points
- Tactile objects that can be used to represent lines and points (e.g. wiki-sticks, fuzzy stickers, etc...)
- Models
- T-Chart, graphic organizer
- Rulers, straightedge
- Graphing calculator
- Assistive Technology (e.g., interactive whiteboard or other software, calculator , communication device)

Key Word Search: coordinate, ordered pair, line, slope